

contact comprises a titanium layer interspersed with titanium silicide, wherein a substantial portion of the titanium silicide is interspersed in the titanium prior to depositing in the opening;

B¹ Cont a conductive contact fill deposited on an upper surface of the conductive contact in a manner such that the contact fill fills substantially the entire contact opening, wherein the contact fill comprises titanium nitride.

10. (Amended) A contact structure having a contact opening formed over a junction region in a silicon substrate, comprising:

B² a conductive contact layer comprising titanium interspersed with titanium silicide, wherein the conductive contact layer is deposited directly on an upper surface of the silicon substrate over the junction region, wherein a substantial portion of the titanium silicide is interspersed in the titanium before the conductive contact layer is deposited on the upper surface of the silicon substrate over the junction region, wherein the titanium silicide in the conductive contact layer reduces consumption of silicon from the junction region during a silicidation reaction between silicon in the substrate and titanium in the conductive contact layer;

a diffusion barrier layer formed on an upper surface of the conductive contact layer;

a contact fill formed on an upper surface of the diffusion barrier layer, wherein the contact fill comprises titanium nitride, wherein the titanium nitride fills substantially the entire contact opening.

REMARKS

In the Office Action, the Examiner rejected Claims 1, 5, 10, and 12 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,773,363 to Derderian et al. Applicant notes Derderian discloses depositing titanium on an upper surface of the conductive contact and then reacting the titanium with silicon in the junction region to form titanium silicide, while Applicant's present invention, in one aspect, is directed toward reducing the consumption of silicon in the junction region by pre-forming a substantial portion of the titanium silicide and interspersing it in the titanium before depositing onto the contact surface. (See, e.g. Claims 1 and 10 as amended) The titanium silicide in Derderian is formed by One of the novel aspects of Applicant's present invention is to deposit a titanium interspersed with titanium silicide layer of material onto the contact surface so that the amount of titanium silicide formed resulting from the